CLAIMS

[1] A surface-mount SAW device comprising:

a mounting substrate composed of an insulating substrate, external electrodes mounted on the underside of said insulating substrate for surface mounting use, and conductor traces arranged on the top of said insulating substrate and connected to said external electrodes;

a SAW chip provided with a piezoelectric substrate, an IDT electrode formed on one surface of said piezoelectric substrate, and connection pads connected to said conductor traces via conductor bumps; and

sealing resin layer coated all over the outer surface of said flip-chip mounted SAW chip and down to the top surface of the mounting substrate to form an airtight space between said IDT electrode and said mounting substrate;

wherein the crystal structure of the piezoelectric substrate belongs to any one of point groups C_1, C_2, C_s, C_{2v}, C_4, C_{4v}, C_3, C_{3v}, C_6 and C_{6v} in terms of Schoenflies symbols;

characterized in that charging of the sealing resin layer is suppressed by increasing the conductivity of said piezoelectric substrate.

[2] The surface-mount SAW device of claim 1, characterized in that the conductivity of said piezoelectric substrate is increased by heating an oxidizable element while holding it in contact with said piezoelectric substrate.

[3] The surface-mount SAW device of claim 1, characterized in that at least one of such metals as Fe, Zr, Al Cr, Mn, Rh, Cu, V, W, U and Sn is contained as an impurity in said piezoelectric substrate to provide increased conductivity of said piezoelectric substrate.

[4] The surface-mount SAW device of any one of claims 1 to 3, characterized in that said piezoelectric substrate is made of $LiTaO_3$.

[5] A surface-mount SAW device comprising:

a mounting substrate composed of an insulating substrate, external electrodes mounted on the underside of said insulating substrate for surface mounting use, and conductor traces arranged on the top of said insulating substrate and connected to said external electrodes;

a SAW chip provided with a piezoelectric substrate, an IDT electrode formed on one surface of said piezoelectric substrate, and connection pads connected to said conductor traces via conductor bumps; and

sealing resin layer coated all over the outer surface of said flip-chip mounted SAW chip and down to the top surface of the mounting substrate to form an airtight space between said IDT electrode and said mounting substrate;

wherein the crystal structure of the piezoelectric substrate belongs to any one of point groups C_1, C_2, C_s, C_{2v}, C_4, C_{4v}, C_3, C_{3v}, C_6 and C_{6v} in terms of Schoenflies symbols;

characterized in that:

said sealing resin layer has a relative dielectric constant of 3.2 or below and a volume resistivity of 1×10^{16} Ω·cm or below;

the thickness H of the sealing resin layer on the top surface of said SAW chip is 0.02 mm or above; and

the conductivity of said piezoelectric substrate is increased to suppress charging of the sealing resin layer.